

1. A-Rod accelerates his Hummer from rest at a rate of 4.0 m/s^2 [fwd] for 10 s. He then travels at a constant velocity for 12 s and finally comes to rest over a displacement of 100 m. Assuming that both accelerations are uniform in nature, determine his average velocity.
2. During a football game, Igor is 8.0 m behind Brian and is running at 7.0 m/s [E]. At this moment, Brian catches the ball and starts accelerating from rest at 2.8 m/s^2 [E]. When will Igor catch Brian and how far downfield has Brian run by this time?
3. Jack, who is running at 6.0 m/s [W] to catch his school bus, sees it starting to move when he is 15 m away from it. If the bus accelerates from rest at 1.0 m/s^2 [W], will Jack catch up to it?
4. A turtle is moving with uniform acceleration along a straight ditch. He starts his in-shell stopwatch as he passes a fence post and notes that it takes him 10 s to reach a tree that is 10 m farther along the ditch. As he passes the pine tree, his speed is 1.2 m/s. How far from the fence post was he when he started accelerating, assuming that he began his motion from rest?
5. A speeding car travelling at 108 km/h in a 60 km/h zone passes a police officer who is at rest, enjoying his morning cup of Java and a donut. Two and a half seconds after the speedster passes the officer, the officer begins pursuit, accelerating at 2.85 m/s^2 . Determine how long it takes the officer to catch the speedster, assuming that the speedster has maintained the same velocity throughout?
6. Two trains, each carrying a load of chewing gum, head towards each other on a straight, not Wrigley, track. When the two are 250 m apart, their engineers see each other and immediately hit the brakes. The Trident, heading west at 96 km/h decelerates at 4.0 m/s^2 while the eastbound Hubba Bubba, travelling at 110 km/h, decelerates at 3.0 m/s^2 . Don't want to burst your bubble but, will the two trains collide?
7. A stone is dropped into the water from a bridge 44 m above the water. Another stone is thrown vertically downward 1.0 s after the first stone was dropped. Both stones strike the water at the same time. What was the initial velocity of the second stone?
8. A rock is dropped from a cliff and the sound of it striking the water is heard 3.0 s after the rock was released. Knowing that sound travels at a constant speed, and that the speed of sound that day was 330 m/s, determine the height of the cliff.

ANSWERS

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| 1. 29 m/s [fwd] | 5. 23.3 s |
| 2. 1.8 s 4.4 m | 6. |
| 3. | 7. 12 m/s |
| 4. 8.0 m | 8. 40.6 m |